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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,341	03/12/2004	Curt Nelson	200311972	1930

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EXAMINER

SARKAR, ASOK K

ART UNIT	PAPER NUMBER
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2891

DATE MAILED: 05/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/801,341	Applicant(s) NELSON ET AL.	
	Examiner Asok K. Sarkar	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3-5, 7-10, 12-14, 16-20, 24-26, 28-31 and 53-76 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-5, 7-10, 12-14, 16-20, 24-26, 28-31 and 53-76 is/are rejected.
- 7) ☒ Claim(s) 5, 14 and 26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 17, 2006 has been entered.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 3 – 5, 7 – 10, 12 – 14, 16 – 20, 24 – 26, 28 – 31 and 53 – 76 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Objections***

3. Claims 5, 14 and 26 are objected to because of the following informalities: Sol – gel films are not deposited by vacuum deposition process. The vacuum deposition process should be deleted from these claims. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 3, 7 – 10, 12, 16 – 20, 24, 26 – 31 and 53 – 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peng, US 2002/0016075 in view of Liao, US 2005/0087513.

Regarding claims 3, 12, 24 and 54 – 57, Peng teaches a method of forming a thin film for an electronic device comprising:

- a) a step of forming one or more layers of material on at least a portion of at least one surface of a substrate, the layer of material being a precursor of a conductive material (ITO is a conductive material);

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- b) a step of selectively modifying one or more material properties (crystallinity) of at least a first(one) portion of the formed layer of material by selectively directing laser radiation on the first portion; and
- c) a step of selectively removing at least a second portion of the one or more layers of material wherein the at least a second portion comprises one or more non – annealed unmodified portions of said one or more material layers. with reference to the Abstract of the article and Figs 2 and 3 and associated descriptions in paragraphs 20 – 25. The removed portion comprises material that is unmodified and remains amorphous.

Peng fails to teach forming the layer of sol – gel precursor material.

Liao teaches forming the ITO film by vacuum deposition or sol – gel process in paragraph 20.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Liao and form the ITO film by sol – gel process since the processes are functionally equivalent.

Regarding claims 7, 16, 28 and 53, Peng teaches selective modification by laser annealing process in the Abstract.

Regarding claims 8, 17 and 29, Peng teaches laser annealing processes comprise localized annealing using a pulsed excimer laser in paragraphs 20 and 21 and Fig. 3.

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Regarding claims 9, 18 and 30, Peng teaches the formed material layer is selectively annealed, the selection being based at least in part on its position on said substrate in paragraph 22.

Regarding claims 10, 19 and 31, Peng teaches changing the material property such as crystallinity in the Abstract.

Regarding claim 20, Peng teaches the thin film comprises one film 38 with reference to Fig. 3.

8. Claims 4, 5, 13, 14, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peng, US 2002/0016075 in view of Liao, US 2005/0087513 as applied to claims 55 – 57 above, and further in view of Kijima, US 2004/0136891.

Regarding these claims, Peng in view of Liao fails to teach the deposition process of the sol – gel films such as spin coating or spraying.

Kijima teaches that that sol –gel thin films are obtained by coating a substrate by methods such as spin coating or spraying and are well known in the industry in paragraph 127.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to form the sol –gel ITO film by methods such as spin coating or spraying and are well known in the industry as taught by Kijima in paragraph 127.

9. Claims 58 – 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peng, US 2002/0016075 in view of Liao, US 2005/0087513 as applied to claims 55 – 57 above, and further in view of Chung, "Crystallization of Ultra – Low Temperature ITO by XeCl", Digest of Technical papers – Society For Information Display International.

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Symposium (2002), 33, 57 – 59 and Hosono, Japanese Journal of Applied Physics, Part 2: Letters (1998), 37(10A), L1119 – L1121.

Regarding claims 58 – 64, Peng teaches forming electrodes for LCD devices wherein he uses lasers of two wavelengths depending on the design (paragraph 21) and power level, the duration and the size of the beam to determine the number of exposures for a selected region on a substrate in paragraph 23, but fails to teach irradiating the first portion and a third portion of the layer differently (claim 58); with first portion overlying the third portion, or on the side or coplanar (claims 59 - 61) and are irradiated with different characteristics of the laser (claim 62) to have different properties in these two portions (claims 63 – 64).

Chung teaches how the laser fluence, number of laser pulses and number of shots can influence the various properties of the ITO films in terms of crystallinity, conductivity and transmission under the Results and Discussion part of their paper in pages 57 – 59 for the XeCl laser for manufacture of LCD devices.

Similarly, Hosono teaches how KrF laser with different power density and irradiation pulse number can change the crystallinity of the deposited ITO film in terms of crystallization depth and etching properties in pages L119 – L1121 under the results and discussion part of their paper.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention that during the manufacture of an LCD device, transparent ITO electrodes will be fabricated in various parts of the total device and they will be not only of different thicknesses and width depending on the pattern and design requirement but

also different areas of the device will require electrodes of different crystallinity, resistivity and transparency all of which depend of various laser properties as taught by Chung and Honso.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention that laser irradiation will be applied to the first portion and a third portion of the layer differently (claim 58); with first portion overlying the third portion, or on the side or coplanar (claims 59 - 61) and are irradiated with different characteristics of the laser (claim 62) to have different properties in these two portions (claims 63 - 64) for the benefit of providing different properties to the ITO electrodes in various parts of the device as taught by Chung and Honso with minimum production cost for the final LCD device.

Regarding claims 65 and 66, limitations of these claims have been described earlier in rejecting claims 58 - 64.

10. Claims 67 and 69 - 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peng, US 2002/0016075 in view of Chung, "Crystallization of Ultra - Low Temperature ITO by XeCl", Digest of Technical papers - Society For Information Display International Symposium (2002), 33, 57 - 59 and Hosono, Japanese Journal of Applied Physics, Part 2: Letters (1998), 37(10A), L1119 - L1121.

Limitations of these claims have been described earlier in rejecting claims 55 - 66.

11. Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peng, US 2002/0016075 in view of Chung, "Crystallization of Ultra - Low Temperature ITO by



XeCl", Digest of Technical papers – Society For Information Display International Symposium (2002), 33, 57 – 59 and Hosono, Japanese Journal of Applied Physics, Part 2: Letters (1998), 37(10A), L1119 – L1121 as applied to claim 67 above, and further in view of Liao, US 2005/0087513

Limitations of this claim have been discussed earlier in rejecting claims 55 – 66.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Heckner, DD 258000 A teaches patterning of amorphous ITO films by using localized annealing with radiation and etching the unannealed portion.

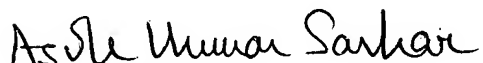
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Asok K. Sarkar

May 10, 2006

Primary Examiner